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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/796,116

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Tamotsu Morimoto

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EXAMINER

CROWELL, ANNA M

ART UNIT

PAPER NUMBER

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/796,116	Applicant(s) MORIMOTO ET AL.	
	Examiner Michelle Crowell	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 7 and 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuchiya et al. (U.S. 5,716,534).

Referring to Figures 1, 27-30, column 4, line 47-column 7, line 6, and column 12, line 8-column 13, line 15, Tsuchiya et al. discloses a plasma processing apparatus comprising: a lower electrode 4 for placing an object W to be processed thereon (col. 4, lines 50-54); an upper electrode 21 disposed above the lower electrode 4 so as to oppose it (col. 6, lines 21-22); an adjusting mechanism 3 for adjusting a spacing between the upper and lower electrodes 21, 4 by raising or lowering the lower electrode (col. 4, lines 50-54, col. 6, lines 24-26); and a high-frequency power supply 29, 18 for applying high-frequency power to at least one of the upper and lower electrodes 21, 4 the high-frequency power being applied to either one of the electrodes to cause plasma igniting (col. 6, lines 4-11, lines 27-33), wherein the adjusting mechanism 3 has a drive mechanism configured to make the spacing larger before the time of plasma extinction than during plasma processing of the object to be processed placed on the lower electrode (col. 7, lines 1-6). Additionally, the plasma processing apparatus further comprising: a first high-frequency power supply 29 for applying first high-frequency power to

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the upper electrode 21 (col. 6, lines 27-33); and a second high-frequency power supply 18 for applying second high-frequency power (col. 6, lines 4-11).

With respect to claim 9, the plasma processing apparatus further includes that the adjusting mechanism 3 has a drive mechanism for moving the lower electrode away from the upper electrode (col. 6, lines 24-26).

With respect to claim 10, the plasma processing apparatus further includes that the first high-frequency power is turned off after the second high-frequency power is turned off (col. 12, line 66- col. 13, line 8).

With respect to claim 11, the plasma processing apparatus further includes that etching is performed as the plasma processing (col. 4, lines 47-48).

3. Claims 7-9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Koshiishi et al. (U.S. 5,919,332).

Referring to Figure 1 and column 9, line 7-column 11, line 36, Koshiishi et al. discloses a plasma processing apparatus comprising: a lower electrode 6 for placing an object W to be processed thereon (col. 9, lines 16-19); an upper electrode 21 disposed above the lower electrode 6 so as to oppose it (col. 9, lines 66-67); an adjusting mechanism 7, 8 for adjusting a spacing between the upper and lower electrodes 21, 6 by raising or lowering the lower electrode (col. 9, lines 20-27); and a high-frequency power supply 47, 44 for applying high-frequency power to at least one of the upper and lower electrodes 21, 6 the high-frequency power being applied to either one of the electrodes to cause plasma igniting (col. 11, lines 23-29), wherein the adjusting mechanism 7, 8 has a drive mechanism configured to make the spacing larger before the time of

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plasma extinction than during plasma processing of the object to be processed placed on the lower electrode (col. 11, lines 50-57).

With respect to claim 8, the plasma processing apparatus further comprising: a first high-frequency power supply 247 for applying first high-frequency power to the upper electrode 21 (col. 9, lines 23-29); and a second high-frequency power supply 44 for applying second high-frequency power having a lower frequency than the first high-frequency power to the lower electrode (col. 9, lines 17-23).

With respect to claim 9, the plasma processing apparatus further includes that the adjusting mechanism 7, 8 has a drive mechanism for moving the lower electrode away from the upper electrode (col. 9, lines 20-27).

With respect to claim 11, the plasma processing apparatus further includes that etching is performed as the plasma processing (col. 9, lines 7-9).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuchiya et al. (U.S. 5,716,534) in view of Koshiishi et al. (U.S. 5,919,332).

The teachings of Tsuchiya et al. have been discussed above.

It should be noted that Tsuchiya et al. discloses controllers for controlling the power sources and thus Tsuchiya et al. is capable of operating the power sources at various frequencies.

However, Tsuchiya et al. fail to specifically teach that the second high- frequency power has a lower frequency that the first high-frequency power.

Referring to column 11, lines 17-29 and column 12, lines 9-14, Koshiishi et al. teaches a plasma processing apparatus wherein the second high- frequency power 44 has a lower frequency that the first high-frequency power 47 in order to collect ions in a plasma and control the speed of radical atoms incident on the object. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the second high- frequency power of Tsuchiya et al. to have a lower frequency that the first high-frequency power as taught by Koshiishi et al. in order to collect ions in a plasma and control the speed of radical atoms incident on the object.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koshiishi et al. (U.S. 5,919,332) in view of Tsuchiya et al. (U.S. 5,716,534).

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The teachings of Koshiishi et al. have been discussed above.

Koshiishi et al. fail to specifically teach that the first high-frequency power is turned off after the second high-frequency power is turned off.

Referring to column 12, line 66-column 13, line 8, Tsuchiya et al. teaches a plasma processing apparatus wherein the first high-frequency power is turned off after the second high-frequency power is turned off so that the charges accumulated on the object can be removed. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the first high-frequency power of Koshiishi et al. to be turned off after the second high-frequency power is turned off as taught by Tsuchiya et al. so that the charges accumulated on the object can be removed.

Response to Arguments

8. Applicant's arguments filed October 12, 2006 have been fully considered but they are not persuasive.

Applicant has argued that Tsuchiya et al. fail to teach that the adjusting mechanism has a drive mechanism configured to make the spacing larger before the time of plasma extinction than during plasma processing; however, Tsuchiya et al. satisfy this requirement since this claim limitation is broad. The claim limitation of "configured to make the spacing larger before the time of plasma extinction than during plasma processing" reads on the time period before plasma ignition. During the time period before plasma ignition, the wafer is loaded and unloaded (drive mechanism is moved downward) and thus, the spacing at wafer loading/unloading is larger than

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during plasma processing (col. 7, lines 1-6). Therefore, the rejection of Tsuchiya et al. satisfy the claimed requirements.

Applicant has argued that Koshiishi et al. fail to teach that the adjusting mechanism has a drive mechanism configured to make the spacing larger before the time of plasma extinction than during plasma processing; however, Koshiishi et al. satisfy this requirement since this claim limitation is broad. The claim limitation of “configured to make the spacing larger before the time of plasma extinction than during plasma processing” reads on the time period before plasma ignition. During the time period before plasma ignition, the wafer is loaded and unloaded (drive mechanism is moved downward) and thus, the spacing at wafer loading/unloading is larger than during plasma processing (col. 11, lines 50-57). Therefore, the rejection of Koshiishi et al. satisfy the claimed requirements.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:30 -6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michelle Crowell *MC*
Patent Examiner
Art Unit 1763


LUZ ALEJANDRO-MULERO
PRIMARY EXAMINER